

## Real-time *in vivo* ROS monitoring with luminescent nanoparticles reveals skin inflammation dynamics: supplement

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# Real-time *in vivo* ROS Monitoring with Luminescent Nanoparticles Reveals Skin Inflammation Dynamics

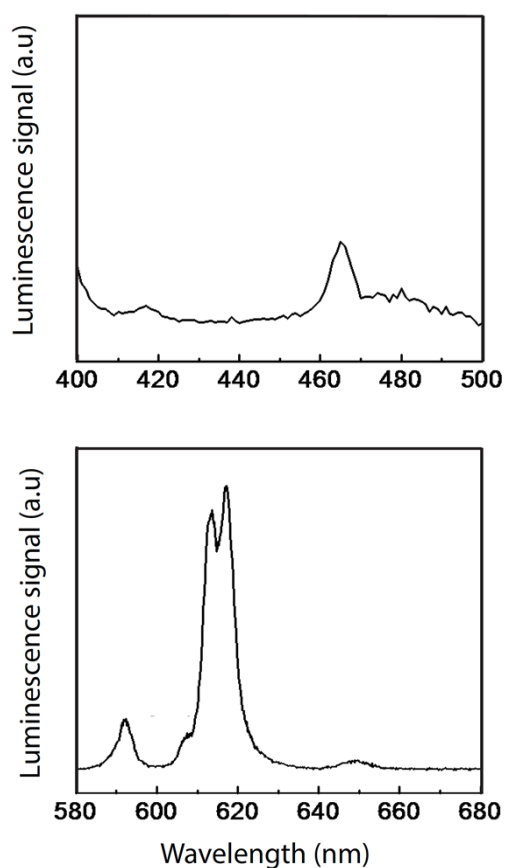
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## Supplementary material

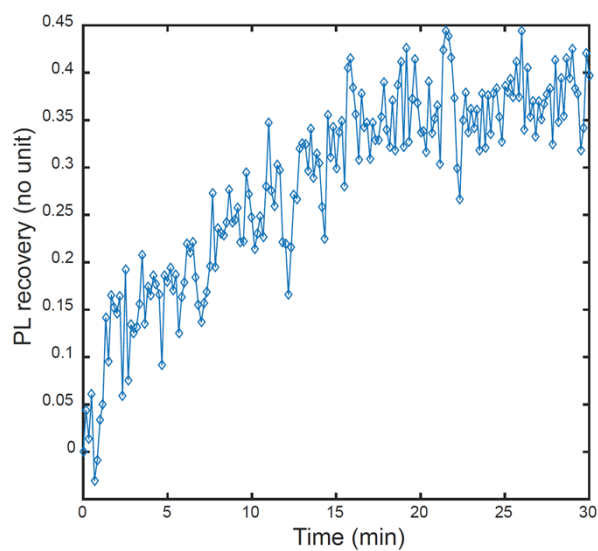
**Nanoparticle synthesis.** Sodium orthovanadate  $\text{Na}_3\text{VO}_4$  (99.9%, Alfa Aesar) was dissolved in ultrapure water to a final concentration of 0.1 M, the pH was adjusted to 12.5–13.0, and the solution was filtered through a 0.22  $\mu\text{m}$  syringe filter (Solution 1).  $\text{Gd}(\text{NO}_3)_3 \cdot 6\text{H}_2\text{O}$  (purity 99.9%, Alfa Aesar) and  $\text{Eu}(\text{NO}_3)_3 \cdot 6\text{H}_2\text{O}$  (99.9%, Alfa Aesar) were dissolved in ultrapure water to a final concentration of 0.1 M to obtain 60% vol  $\text{Gd}(\text{NO}_3)_3$  and 40% vol  $\text{Eu}(\text{NO}_3)_3$ . Solution 1 was stirred vigorously at ambient temperature. The same volume of 0.1 M rare-earth nitrate solution was then added with a flow rate of about 1 mL/min. During the addition, the pH was verified at regular time intervals. When the pH approached 9.5, a 1 M NaOH solution was added until the pH reached 10.5. After completion of the addition, the stirring was maintained for 30 min. The solution was then centrifuged at 26,300 g for 20 min multiple times until the colloid conductivity decreased below 100  $\mu\text{S}/\text{cm}$ .

***GdVO<sub>4</sub>:Eu nanoparticle excitation and emission spectra.***



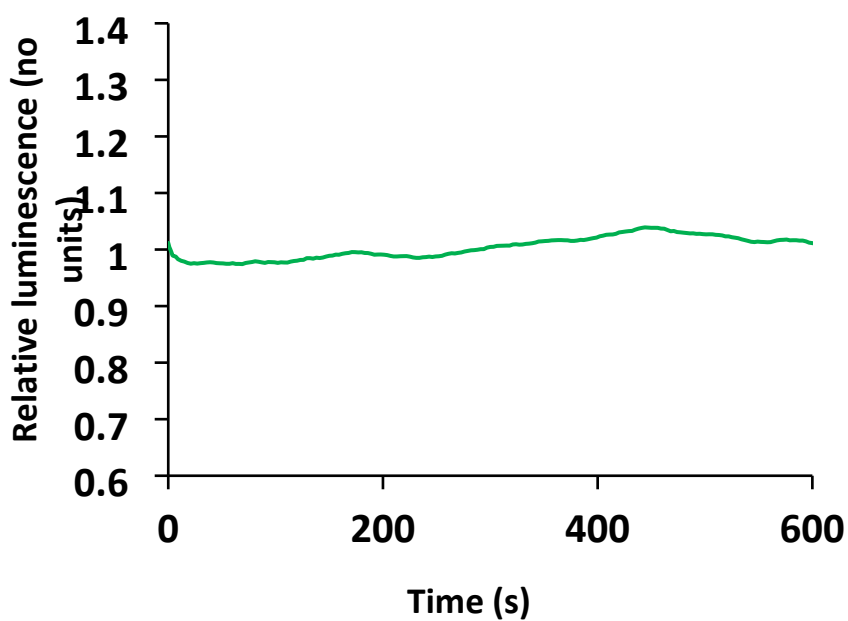
**Figure S1.** Excitation spectrum (top, collection at 615 nm) and emission spectrum (bottom) of GdVO<sub>4</sub>:Eu nanoparticles (Hitachi F-4500 spectrophotometer).

***Kinetics of in vitro response***



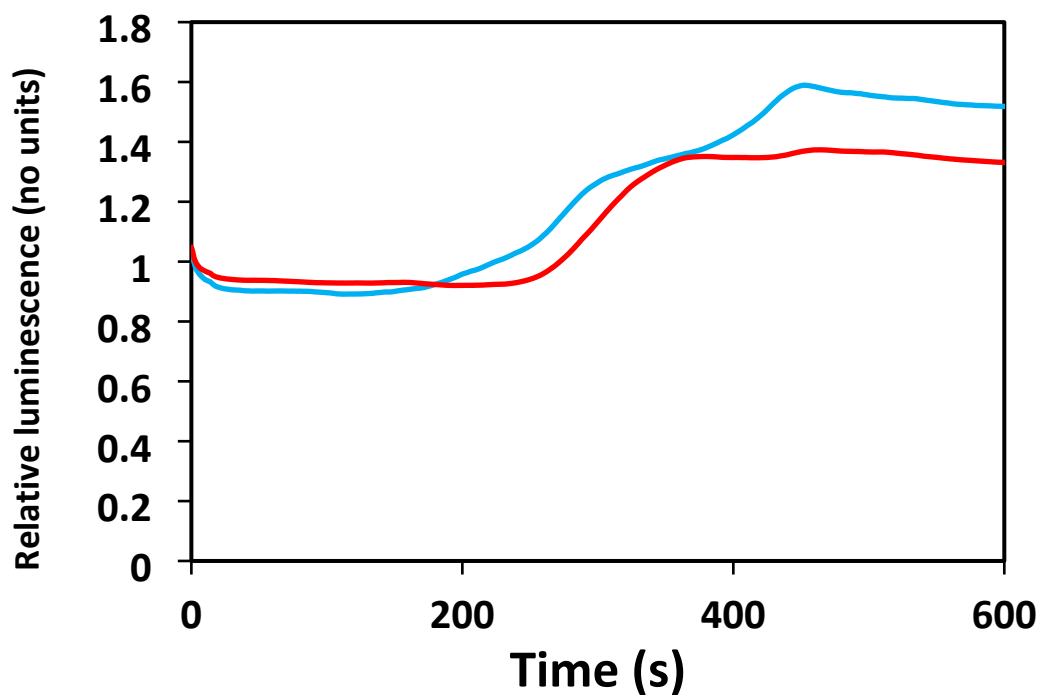
**Figure S2.** Photoluminescence recovery of GdVO<sub>4</sub>:Eu nanoparticles embedded in an agarose gel after application of a solution of 10  $\mu$ M H<sub>2</sub>O<sub>2</sub>.

### *Response to acetone treatment*



**Figure S3.** Luminescence after pure acetone application under 466 nm illumination (5 mW @466 nm excitation, magnification x 2, NA=0.2).

### *Effect of excitation intensity and nanoparticle concentration*



**Figure S4.** Response to MS stimulation after injection of a  $\text{GdVO}_4\text{:Eu}$  nanoparticle solution ( $[V]=40\text{ mM}$ ) under a 5 mW excitation power (red) or of a  $[V]=10\text{ mM}$  solution under a 20 mW

*excitation power (blue). The responses are qualitatively similar to the ones obtained in our reference conditions ([V]=10 mM, 5 mW).*

**Supplementary Movie S1.** Recording of nanoparticle luminescence at 617 nm after injection in an anesthetized mouse ear (Nikon AxioZoom AZ100, Objective magnification x2, zoom 1.3, 6 mW.cm<sup>-2</sup> excitation at 466 nm). Total duration 12 min and application of MS after 2 min.